



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/779,613	02/18/2004	Makoto Iwashima	50195-417	8884

7590 02/24/2006
McDERMOTT, WILL & EMERY
600 13th Street, N.W.
Washington, DE 20005-3096

EXAMINER

PRESTON, ERIK D

ART UNIT	PAPER NUMBER
----------	--------------

2834

DATE MAILED: 02/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

all

Office Action Summary

Application No.

10/779,613

Applicant(s)

IWASHIMA ET AL.

Examiner

Erik D. Preston

Art Unit

2834

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 December 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 10/06/2005.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

Claim 10 is objected to because of the following informalities: In the 2nd line of the claim, the phrase "...to the coolant delivery conduit..." lacks proper antecedent basis and, for examination purposes, will be interpreted as saying: "...to a coolant delivery conduit..." Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-8 & 18-20 are rejected under 35 U.S.C. 102(e) as being anticipated by Takahashi et al. (US 2004/0183385).

Applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

With respect to claims 1 & 18, Takahashi teaches a power converter arranged in series with a motor to form a unitary structure through which an output shaft extends, comprising: A plurality of coolers (Fig. 6, #18) each of which extends along a radial direction with respect to an output shaft (Fig. 6, #8) so as to be perpendicular to the

output shaft, and having a cooling surface defined by a direction parallel to the output shaft and the radial direction; and a power semiconductor module (Fig. 6, #16) mounted on the cooling surface of at least one of the plurality of coolers to supply electric power to a motor.

With respect to claim 2, Takahashi teaches the power converter of claim 1, wherein the output shaft includes a motor shaft.

With respect to claim 3, Takahashi teaches the power converter of claim 1, wherein each of the plurality of coolers includes a plurality of cooling surfaces (the mounting and finned surfaces of the coolers), and each is defined by the direction parallel to the output shaft and the radial direction (as seen in Fig. 6).

With respect to claim 4, Takahashi teaches the power converter of claim 1, wherein each of the plurality of coolers includes a set of coolers opposing one another, and each of the set of coolers extends along the radial direction (as seen in Fig. 6).

With respect to claim 5, Takahashi teaches the power converter of claim 1, wherein each of the plurality of coolers is mounted on a cylindrical structural member (Fig. 6, #13) surrounding the output shaft.

With respect to claim 6, Takahashi teaches the power converter of claim 1, wherein each of the plurality of coolers is mounted on a structural member located at an end face of a motor (as seen in Fig. 1).

With respect to claim 7, Takahashi teaches the power converter of claim 1, wherein each of the plurality of coolers includes a plurality of coolant passageways (the channels between the fins) that extend in parallel to the output shaft (as seen in Fig. 6).

Art Unit: 2834

With respect to claim 8, Takahashi teaches the power converter of claim 1, wherein each of the plurality of coolers includes a plurality of cooling passageways (the channels between the fins) that extend along the radial direction.

With respect to claim 19 & 20, Takahashi teaches the power converter of claims 1 & 18, wherein the plurality of coolers are arranged along corresponding radial directions, each of which is perpendicular to the output shaft, at circumferentially spaced intervals therebetween (as seen in Fig. 6).

Claims 1-10 & 18-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Gruendel et al. (DE 10112799).

With respect to claims 1 & 18, Gruendel teaches a power converter arranged in series with a motor to form a unitary structure through which an output shaft extends, comprising: A plurality of coolers (Fig. 1, #40) each of which extends along a radial direction with respect to an output shaft (Fig. 1, #18) so as to be perpendicular to the output shaft, and having a cooling surface (the surface of the coolers on which the power semiconductors are mounted) defined by a direction parallel to the output shaft and the radial direction (the cooling surface extends axially, and its thickness is defined by the radial direction); and a power semiconductor module (Fig. 1, #46) mounted on the cooling surface of at least one of the plurality of coolers to supply electric power to a motor. It is noted that this claim makes no positive recitation of the cooling surface upon which the power semiconductor is mounted being a 2 dimensional planar surface being defined by the axial and radial directions, and even if it did positively recite the above limitation, which it does not, it would have been obvious to one of ordinary skill in

Art Unit: 2834

the art at the time of the invention to position the semiconductor modules of Gruendel on a 2 dimensional planar surface being defined by the axial and radial directions (such as is taught by Brusasco et al. (US 5315194)) since it has been held that changing the position of an element of an invention is prima facie obvious in the absence of new or unexpected results (In re Japikse, 181 F.2d 1019, 86 USPQ 70 (CCPA 1950)).

With respect to claim 2, Gruendel teaches the power converter of claim 1, wherein the output shaft includes a motor shaft.

With respect to claim 3, Gruendel teaches the power converter of claim 1, wherein each of the plurality of coolers includes a plurality of cooling surfaces (the mounting and finned surfaces of the coolers), and each is defined by the direction parallel to the output shaft and the radial direction (as seen in Fig. 1).

With respect to claim 4, Gruendel teaches the power converter of claim 1, wherein each of the plurality of coolers includes a set of coolers opposing one another, and each of the set of coolers extends along the radial direction (as seen in Fig. 1, each cooler is opposed by another positioned 180 degrees away from it).

With respect to claim 5, Gruendel teaches the power converter of claim 1, wherein each of the plurality of coolers is mounted on a cylindrical structural member (Fig. 1, #28) surrounding the output shaft.

With respect to claim 6, Gruendel teaches the power converter of claim 1, wherein each of the plurality of coolers is mounted on a structural member located at an end face of a motor (as seen in Fig. 1, the coolers are mounted on an external portion of the motor housing).

With respect to claim 7, Gruendel teaches the power converter of claim 1, wherein each of the plurality of coolers includes a plurality of coolant passageways (the channels between the fins) that extend in parallel to the output shaft (as seen in Fig. 1).

With respect to claim 8, Gruendel teaches the power converter of claim 1, wherein each of the plurality of coolers includes a plurality of cooling passageways (the channels between the fins) that extend along the radial direction.

With respect to claim 9, Gruendel teaches the power converter of claim 1, wherein an end portion of each of the coolers is connected to a delivery conduit (which inherently exists, Paragraph 30) communicating with coolant passages (Fig. 1, #32) of the other of the plurality of coolers.

With respect to claim 10, Gruendel teaches the power converter of claim 1, wherein an end portion of each of the plurality of coolers is connected to an annular coolant passage (Fig. 1, #32) connected to a coolant delivery conduit (which inherently exists, Paragraph 30) connected to a power converter.

With respect to claim 19 & 20, Gruendel teaches the power converter of claims 1 & 18, wherein the plurality of coolers are arranged along corresponding radial directions, each of which is perpendicular to the output shaft, at circumferentially spaced intervals therebetween (as seen in Fig. 1).

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 11 & 14-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishiyama (US 5632351 previously presented) in view of Gruendel et al. (DE 10112799). Ishiyama teaches a capacitor disposed between respective ones of a plurality of heat sinks adapted to smooth a DC voltage, a current sensor (Fig. 2, #29 #30) disposed in a corner section projecting from a cross sectional circular shape of a power converter and detecting output currents of the power semiconductor module, an AC output terminal (Fig. 2, #26) disposed in a corner section projecting from a cross sectional circular shape of a power converter and connecting a power converter and a motor, wherein the AC output terminal is a three-phase output terminal and has three output terminals (Fig. 2, #26-28), and each of the three output terminals is disposed in a corresponding one of three corner sections projecting from the cross sectional circular shape of the power converter, and further comprising a DC power input terminal (Fig. 2, #39) disposed in a corner section, projecting from a cross sectional circular shape of a power converter, in which no other component elements are located, but it does not teach a plurality of coolers each of which extends along a radial direction with respect to an output shaft so as to be perpendicular to the output shaft, and having a cooling surface defined by a direction parallel to the output shaft and the radial direction; and a power semiconductor module mounted on the cooling surface of at least one of the plurality of coolers to supply electric power to a motor. However, Gruendel teaches the power converter of claim 1 (as described above). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the cooling structure of Ishiyama in view of the cooling structure as taught by Gruendel because it provides a

Art Unit: 2834

cooling means for power semiconductors that is compact, economically producible and reliable (Gruendel, Paragraph 13).

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ishiyama (US 5632351 previously presented) in view of Gruendel et al. (DE 10112799) further in view of Kim et al. (US 2001/0054730 previously presented). Ishiyama in view of Gruendel teaches the power converter of claim 11, but it does not teach that the capacitor has a cross sectional shape formed in a fan-shape or a trapezoid. However, Kim teaches a capacitor that has a trapezoidal cross sectional shape (Paragraph 30). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the capacitor of Ishiyama in view of the capacitor as taught by Kim because it has a high dielectric constant while avoiding a degradation in the capacitance (Kim, Paragraphs 6,8 & 11).

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gruendel et al. (DE 10112799) in view of Jackson et al. (US 2942165 previously presented). Gruendel teaches the power converter of claim 1, wherein each of the plurality of coolers has a pair of cooling surfaces, and terminals of the power semiconductor module are mounted on one of the pair of cooling surfaces, but it does not teach that the power semiconductor module is mounted on both sides of the coolers, or that terminals of the power semiconductor modules have a symmetric relationship with those on the other cooling surfaces with respect to a corresponding one of the plurality of coolers. However, Jackson teaches a cooler (Fig. 2, #6) with a pair of cooling surfaces upon each of which is mounted a semiconductor device (Fig. 2,

Art Unit: 2834

#1-5). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the coolers of Ishiyama in view of the cooler as taught by Jackson because it provides a rectifier assembly that has a minimum bulk, but which dissipates heat losses with a high efficiency (Col. 1, Lines 42-45).

Response to Arguments

Applicant's arguments with respect to claims 1-18 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US 5315194 & DE 2228856

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Art Unit: 2834

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Erik D. Preston whose telephone number is (571)272-8393. The examiner can normally be reached on Monday through Friday 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Darren Schuberg can be reached on (571)272-2044. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



02/08/2006

